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COLUMBIA RIVER IMPROVEMENT AND THE PACIFIC NORTHWEST.*

By FREDERIC G. YOUNG.

A system of transportation, adjusted to the needs of the Pacific Northwest, can hardly be a counterpart of those developed for the older sections of the country on the opposite and less-folded side of the continent. The specific conclusions with regard to the supplementary functions and to other relations of the rail and the water routes found true throughout the East will probably need modification before being applied here. At any rate, the conditions in the Pacific Northwest that have to be taken into account for determining the features of the most economical and efficient system of transportation for this region are so striking and unique as to warrant a brief reference to them.

The highways over which the productions of the Pacific Northwest must be carried to reach the consumer lie on the Pacific in one direction, and stretch across the backbone of the continent in another. These opposite destinations for fairly equal proportions of its grain, lumber, fish, livestock, wool and fruit affect the features of the transportation system adapted to its needs and differentiate this system from that of the Middle West, whose products almost exclusively find their market in the direction of the Atlantic seaboard.

Again, the striking contrasts between the lay of the land in the Columbia basin and that of the basin of the Mississippi must, in the nature of things, exhibit themselves in contrasting systems of transportation when these have become fully adapted to their respective conditions. On the

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imperceptibly sloping, almost unbroken and but gently undulating plains of the Mississippi and the Missouri the problem of providing economic means for carrying the commodities of commerce is quite different from that presented by a region largely composed of table lands, here and there furrowed by deep valleys with precipitous slopes, and bordered by high ranges of mountains stretched directly across the path of the routes leading out to the markets of the world.

The lines of least desistance for traffic are more pronounced in the Columbia basin than in any portion of the East. The uniform meshes of the railway network of the Mississippi Valley will hardly be realized here and for other reasons than a lack of uniform productivity throughout all portions of this basin. The longer way around will, in this region, more frequently be found the more economic route to the market. Until release is found from the pull of gravity so that the lifts and drops in passing over intervening ridges do not involve heavy costs, the main lines of railway here will thread the main valleys. This means that even in the matter of distance the water routes for heavy traffic will be at but slight disadvantage here as compared with the rail; add to this the fact that the Columbia "seeks the ocean on a line parallel with the trade channels and not at right angles to them," as is the case with the Mississippi in relation to the major portion of the volume of trade of its valley; and the further facts that have repeated endorsement of the engineers of the national government, that the banks of the Columbia "are more stable, its waters more clear, its ice blockades are much less in duration than on the great waterway in the East," and we have something of a basis for the presumption that transportation on inland waterways in the Pacific Northwest is destined permanently to assume a comparatively larger importance than in any other section of the country, and that the improvement of these waterways so as to realize their largest utility is a matter of more vital interest to its people than

to those of any other section. In all this we have grounds for a tentative hypothesis at least that the ensemble of conditions in the Pacific Northwest is unusually favorable for reliance upon waterways as routes for heavier traffic and unusually obstructive to the development of a network of air line rail routes with easy gradients.

Before developing this hypothesis, through reference to the experience of the Pacific Northwest, while securing so much of a system as it has, attention should be called to one other aspect of the situation here. The Pacific Northwest is conspicuously a gateway for the commerce between the main body of the American people in the eastern portions of the country and the Orient. Three factors conspire to bring this about. It is on the line of the great-circle route to the East, it has the only sea-level passageway through the Cascade-Sierra barrier on the western edge of the continent, and it possesses the matchless harbors of Puget Sound. The transcontinental lines penetrating to this region were located, built, and have ever since been operated with their gateway interests dominant. Even today the greater construction activities and expenditures for the Hill and the Harriman roads—a Hill road paralleling the Harriman line down the Columbia to Portland, and a Harriman road paralleling the Hill line from Portland to Seattle—show that the interests of the producer of this region are neglected and even sacrificed in the rivalry for the gateway traffic. The local producer has received some consideration at times from these transcontinental railway magnates. A meager provision of “feeders” exists. Some have built more than others, but with all and always competition in the transcontinental service has been the main concern.

As a matter of fact no independent lines for the service of the producer of the Pacific Northwest exist. While the Oregon Railway and Navigation lines, and, in a less degree, the Oregon and California line, were originally planned for local service they soon, through lease and purchase, became

mere links in transcontinental systems. There is thus in a large sense no system of rail transportation for the Pacific Northwest. As it is, the people of this section get the crumbs of service and have laid on their shoulders through high charges the great burden of the support of the systems as carriers of transcontinental traffic.

This situation would make the plight of the producer of the Pacific Northwest extreme were it not for his advantages in the wonderful natural resources at his command. Suppose the haul across the Rockies is a natural one for part of even his bulky grain and lumber. Yet the carrying capacity of these roads is so helplessly overtaxed that they are under the necessity of rejecting consignments, indirectly by exorbitant charges and directly by refusing to furnish cars, as is witnessed at the present time in the embargo on the lumber export business to the Middle West. Increased equipment and double-tracking are out of the question under existing financial conditions. Should the managing agencies of these railway systems redeem themselves in the eyes of the people and win confidence so that with funds at their command they could bring the carrying powers of their roads up to the demands made upon them, yet the producer of this region would still be at the mercy of those who have pretty consistently ignored him except as he might obtain relief through the mediation of the Interstate Commerce Commission or, more effectively, through independent means for getting his productions down to the sea.

The release of the producing energies of this region from the vise-like grip in which they are held by the systems of rail transportation as at present developed would be fully achieved if a system of inland waterways for traffic needs could be made available. On these the annual output of products could, free from the taxing power of monopolies, be floated down to the ocean shipping ports. The rates of carriage on such waterways would regulate not only the charges on the rail routes parallel to them, but also the

rates on the transcontinental carriage to the East. There is no question as to the need of them here. In no other section are present transportation facilities so inadequate to existing demands. Car famines recur regularly and in most aggravated forms. No other section is taxed so heavily for what service it gets. Nowhere else is potential development being retarded to the same degree.

The problem of progress for this section narrows down to about this: Is it feasible to utilize fully through improvement the Columbia and its tributary waterways to relieve this congestion of traffic and so cheapen transportation costs as to stimulate vastly the development of this section? Before turning to an examination of the availability of the Columbian waterways, just one observation on the results of further delay in undertaking a scientific adjustment of these transportation facilities seems advisable. The present condition of perplexingly inadequate facilities, and monopoly charges prohibitive of further development, naturally raises an unreasoning clamor for duplications in hopes of lower rates through competition. This betrays a state of intelligence that is unmindful of the fact that the cost and maintenance of great railway structures, that serve only to divide traffic with a road already existing, mean fastening upon its supporters a load almost the double of what would have been necessary had the service of the existing line been co-ordinated with that of an available waterway. Fortunately, however, the measure of undeveloped resources here protects this region, too, from such permanent incubuses much as eastern sections through their development escaped evils of excessive duplications. Surely a clearer conception on the part of the people at large of what is involved in a scientifically adjusted transportation system would have forestalled the possibility of such a transaction as Mr. Harriman's in diverting thirteen millions from the surplus accumulated through extortionate charges upon the producers in the Oregon Railway and Navigation territory, towards the securing of terminals in Tacoma and

Seattle for his line paralleling the road from Portland to Seattle. And certain it is that the people of the Pacific Northwest if they fail to make a careful inquiry into the problem of supplying themselves with an adequate and an economic system of transportation will burden themselves and their posterity with ill-adapted railway duplications and will continue to serve as pawns for the railway magnates in their game for the prizes of transcontinental traffic.

In the general survey of the situation in the Pacific Northwest it was noticed that the lay of the land and the characteristics of the waterways of this region indicated large utilization of them for purposes of commerce. The safest and probably the quickest way to determine what part and how large a part these waterways are adapted to have in a fully adjusted system of transportation for this region is to trace the development of man's experience in using them and the growth of his plans and achievements in improving them. Barring a few formidable obstructions, the major portion of which have already been obviated and all of which are at a reasonable expense susceptible of being permanently obviated, the Columbia River throughout its course approximates more nearly the character of a ship canal than probably any other river in the world. The Canadian Pacific has run boats on regular schedules on its uppermost stretch, penetrating even to its source, some sixteen hundred miles from its mouth. Much as Hendry Hudson on his voyage of discovery sailed up the river that took his name to where Albany now stands, so Lieutenant Broughton, of Vancouver's expedition, profiting through introduction of Captain Gray, pushed the limits of discovery with his vessel to a point near the Cascade Mountains, one hundred miles up stream.

Though the initial cost of obtaining an "open river" throughout the main stream and the important tributaries will be considerable, the permanency of such improvements and the smallness of the sums necessary for maintenance more than compensate. Such is the general firmness of its

banks (not a little of its course is run between walls of basalt), such is the comparative freedom from the silt that causes erosion and shifting bars, and so short are the periods when it is locked by ice, that its adaptability as a waterway for purposes of commerce may be rated very high.

It was the judgment of John Jacob Astor, or his representative, in establishing Fort Astor, in 1811, near the mouth of the Columbia, that the emporium should be there for commerce with the Orient. A little more than a decade later that judgment was dissented from by the sagacious McLoughlin of the Hudson Bay Company. He moved the entrepot of trade a hundred miles up the river. His idea, in so far as it affects the use of this lower stretch as an arm of the sea, seems destined to stand. It has not merely the sanction implied in the building up of a city of 200,000 people at the head of navigation on the lower Willamette, twelve miles up from its junction with the Columbia, but also a hearty seconding in the plans and projects of the engineering service directing river and harbor improvements. The consideration that weighed with Dr. McLoughlin in establishing Fort Vancouver near the region whence was obtained his company's wealth of commerce holds good today. The ocean liner is brought for its cargo as near as possible to the heart of a large and rich producing country. The improvement, therefore, of the Willamette and Columbia below Portland is virtually of the nature of harbor improvement while that contemplated for the river above and its tributaries is that of inland waterway improvement.

That the waterways of the Columbia basin had eminent natural fitness as avenues of commerce and travel is conclusively proven in the flourishing economic development of this region in the pre-railway era. Up to about 1880, the Columbia River with its tributaries, constituted the only trunk lines of inland commerce and travel in the Pacific Northwest. The facilities of transportation afforded by these waterways had sufficed for the upbuilding of a very

prosperous community. Some three hundred thousand people lived in the valley of the Willamette and along the lower and upper Columbia. Evidences of a high degree of comfort, of large accumulations and of the great volume of commercial activity elicited remarks of astonishment from visitors to this isolated region that was then still practically without railroads. It is safe to say that no other river system since the era of general railway development served so fully the needs of transportation facilities as did this one of the Pacific Northwest.

But the inland waterways of the Pacific Northwest were like those of the other sections of the country destined to be relegated to a position secondary to that of the railways. Only the one-hundred-and-ten-mile stretch from Portland to the sea suffered no eclipse through being paralleled by a railroad. This section of river channel is, however, in its relation to navigation, to be regarded as an arm of the sea, or harbor passageway, rather than as an inland waterway. The general supersession of the waterway for the railway might seem to be significant of the greater all-around utility of the railway in this section, for it appeared to displace the well-established steamboat completely on certain routes and, for aught that appears on the surface, finally. But it is to be noted that the introduction of the railway into this section was not primarily to furnish facilities of a higher order than those of the existing waterways. They were built here not so much to supersede the unsatisfactory steamboat as they were to earn munificent grants of public domain and to supply the final links in the transcontinental lines giving connection with the East. For passenger and higher class freight service the railroad, here as elsewhere, had, of course, the advantage from the start. The railways along the Willamette and the Columbia won out so decisively, however, from quite extraneous reasons. The falls and formidable rapids in these rivers that made necessary short side canals or portage railways furnish the secret of this easy conquest on the part of the railways. These portage

improvements were owned either by private corporations or by the railroads themselves. At the falls of the Willamette, fifteen miles above Portland, a private canal company with its tolls taxed the river traffic nearly out of existence. On the Columbia the owners of the portage railways were also the owners of the railroad paralleling the river. Naturally it was their interest and, from their position of vantage, within their power to block completely the movement of traffic on the river.

Water transportation was not, however, to lapse into a mere tradition in the Columbia basin because of the untoward influence of private monopoly at these portage gateways. Considerable areas of rich and rapidly developing country on the north bank of the Columbia had as yet no railway and kept several lines of boats busy. Another section of country far up the Snake, but magnificently endowed with resources, was not for a long time reached by a railway. It, too, had to rely on a navigable section of that largest tributary of the Columbia for connection with the outside world. The mere idea, too, of a great Columbian waterway had been ardently cherished for more than a century and had too firm a hold in the national consciousness to be completely stifled by the repression of private monopoly. As the dream of Thomas Jefferson it had been back of the leading motive impelling him to urge time and again transcontinental exploration. In his instructions to Meriwether Lewis, when the Lewis and Clark expedition was about to set out, he says: "The object of your mission is to explore the Missouri River, and such principal streams of it, as by its course and communication with the waters of the Pacific Ocean, may offer the most direct and practicable water communication across this continent, for purposes of commerce." The same idea of the larger use of the Columbia as one of the two connecting channels of a transcontinental waterway had been an important feature of the imperial project of John Jacob Astor. And the Hudson Bay Company had actually used it for a generation as

its main highway in conducting its widely extended operations in this section. It had, as we have seen, been the sole reliance in their need of transportation facilities of the widely scattered but exceedingly thriving Oregon communities down to about 1880. And though the railways, fortified as they were with monopoly privileges at the portages along the Columbia, and reinforced through the policy of the private canal company at Oregon City, won out against the upper river traffic; on the lower Columbia the ocean export trade was steadily growing with the general community growth induced by the recently completed railway connections with the East.

But whether the commerce on the different sections of the river waxed or waned, certain influences were promoting the inception of projects of improvement. The pressure of the people in this direction and the activities of their representatives in Congress may always be taken for granted. It is rather the progress of their interests with the engineers of the United States army and the standing the movement was thus getting in administrative circles to which I refer. At the mouth of the Columbia the charts of Admiral Vancouver, of 1792, that of Sir Edward Belcher, of 1839, that of Captain Wilkes, of 1841, the United Coast Survey chart of 1851, and those from periodical surveys thereafter accumulated data from which the problem of widening and deepening the channel across the bar could be solved. The tonnage crossing the bar was increasing year by year. In 1882 the engineers were ready with the details of a project for permanently improving this feature of the river. The value and availability of the waterway from Portland down could never be questioned. Its improvement to navigation by deep-water craft was of utmost importance to the entire Northwest. Not until 1884 was any considerable portion of the produce of this section diverted by the railroads to Puget Sound. The original project for improvement was adopted in 1877.

On the upper river the engineers were making extensive preliminary examinations and reconnaissance surveys while it was still the sole channel of transportation for that rapidly developing "Inland Empire." The exceedingly favorable reports of Major Michler, of 1874, of Major Powell, in 1879, and of Lieutenant Symons, in 1881, gave the demand for an "open river" standing in the inner administration circles. This part of the river was already receiving small appropriations for the removal of minor obstructions in the early '70s. On October 12, 1877, the Secretary of War approved the original plan for canal and locks around the rapids in the Columbia, where it passes through the Cascade Mountain range. In thus tackling one of the two formidable obstructions to navigation the national government may be said to have committed itself to the securing of a channel available to navigation throughout this system of inland waterways.

The task with which the national government was confronted in having undertaken to secure to the people of the Pacific Northwest the advantage of inland waterways is probably best indicated by pointing out the obstructions that are, or were, encountered in passing from its mouth to its source. From the ocean up to the mouth of the Willamette, about ninety-eight miles, where the original depth was from ten to fifteen feet, ocean vessels now pass drawing twenty-five feet of water. The improvement was effected mainly through dredging. From the mouth of the Willamette to the "Cascades," about forty-three miles farther up the river, it is open, and in its natural state has an available depth of eight feet. At the "Cascades" for four and one-half miles it is so contracted in width in passing through mountains that it partakes of the nature of a gorge. In the upper first half mile of this there is a fall of twenty-four feet. Throughout the lower four miles of the gorge the slope is not so steep, but the channel is much obstructed with boulders and reefs. This first great obstruction could be obviated only by a canal and locks. Such works were so far

completed as to be opened to navigation in 1896. Proceeding up the river, for forty-five miles, it was again open with a depth of some eight feet. But here most formidable obstructions are encountered—The Dalles and Celilo Falls. In the course of nine miles the river passes over falls and rapids and through contracted channels that completely block navigation. The fall in this distance is eighty-one feet. For some years these obstructions seemed to puzzle the engineers with their magnitude and to appal Congress through the size of the estimated cost of improvement to open navigation around them. Work has barely begun on an approved project for a canal and locks. Proceeding on beyond Celilo Falls we have again a stretch of open river of some 198 miles, with an available depth of four or five feet. The Snake, the largest tributary, which enters the Columbia 110 miles above Celilo Falls, has 146 miles of navigable channel similar in character to that of the main stream. Were we to proceed along that tremendous stretch of river until we came to the international boundary only two more considerable obstructions would be encountered—Priest Rapids and Kettle Falls. These will require canals and locks. Not only are improvements in progress on the two main tributaries above the mouth of the Snake, the Spokane and the Pend d'Oreille, but the engineers have reported favorably for the removal of the obstructions in about all, if not quite all, of the stretches intervening between those more formidable rapids that will require canals and locks.

Turning back now to the Willamette to note its problems, a complete break in navigation—when the river was in its natural state—was encountered at the falls fifteen miles above Portland. A private corporation, subsidized by the State of Oregon, constructed a canal around these.

Confronted by problems of the character indicated above the national government has made and, on the recommendations of its engineers, proposes to make improvements at different points of the following nature: With the object

of concentrating the river to a moderate width at its mouth and to discharge it as a unit to the sea, thus securing a strong scouring effect with the tidal outflow, the original project, adopted in 1884, provided for a single jetty on the south side of the entrance about four and one-half miles long. This work caused an increase in depth over the bar from twenty to thirty-one feet from 1885 to 1895. But as this desired increase was not permanent, in 1903 a project contemplating an extension of three miles, to the jetty previously constructed, was adopted. A continuing appropriation for the completion of this work has been made. The depth desired is forty feet. The work from the beginning of the original project to the completion of the present extension will cost about \$4,500,000. The two projects were based on the same conception of the nature of the problem and the earlier work is fully utilized in the more extended later project.

The project under which the improvement of the Columbia and lower Willamette is proceeding was adopted in 1902. It proposes a twenty-five foot channel to the sea by the construction of controlling works and dredging. The estimated cost was about \$2,800,000. The port of Portland, using funds obtained from taxation in Portland, has co-operated to the extent of providing about \$1,700,000. Up to June 30, 1904, the national government had applied about \$1,500,000 on this portion of the river. Turning to the main lower branch of the Columbia, the Willamette, the situation calls either for the purchase of the existing canal and locks at the falls from a private corporation or the construction of a new system of locks and canal. The board of engineers that investigated this matter in 1899 recommended an expenditure of \$456,000 either for the acquiring of the present canal and locks, or the building of new ones. The corporation owning the existing improvements declines to sell at the valuation placed upon them by the board of engineers, though the board arrived at its figures through capitalization of the net earnings from the canal at fair

rate of interest as well as by estimates based on cost of reconstruction. Though these locks were built thirty-five years ago (the state furnishing \$200,000, about two-thirds of the cost of construction), the legislature of Oregon, in 1907, appropriated \$300,000 "contingent upon the United States appropriating the sum of \$300,000, or a sum sufficient to acquire by purchase, condemnation, or construction," a canal around the falls at this place. In the Willamette, above these falls, the problem of improvement is quite similar to that, say, of the Illinois River. The Willamette drains the bed of a former arm of the ocean and has not the firm banks of the upper Columbia and its tributaries. These represent channels worn in a sheet of lava that was universally spread over that region. Something like half a million has been used on the upper Willamette and its tributaries, mainly in dredging and snagging, in other words, in maintenance.

At the cascades the project that was adopted in 1877 was not completed in modified form, so as to be open to navigation, until 1896. It has cost some \$4,000,000, and provides for the passage of boats of a maximum draft of seven feet. But to open the river at the cascades without opening it at The Dalles-Celilo obstructions, forty-five miles above, answers comparatively little purpose. The "Inland Empire" lies on beyond Celilo Falls. The problem presented by these latter obstructions seems to have quite appalled the earlier engineers. Several projects in turn have been recommended for overcoming these obstructions. The first contemplated a canal and locks and some straightening of the river at an estimated cost of over \$10,000,000. A plan for a boat railway was next adopted and appropriations were even made for entering upon the construction of it. It was expected to cost \$3,000,000. The river men objected and the engineers do not seem to have been quite sure of its practicability. The project that now stands contemplates a continuous canal sixty-five feet wide at the bottom and eight feet deep. The canal is to have four locks

and is estimated to cost something over \$4,000,000. As the Secretary of War conditioned the beginning of work upon it upon the United States securing the right-of-way free of cost, the State of Oregon purchased the right-of-way at a cost of \$70,000 and conveyed it to the United States. In order to obtain some relief for the producers in the region above this point from the exorbitant freight charges of the railways, the State of Oregon had also, in 1906, at a cost of \$165,000, built a portage railroad around the obstructions.

The improvements in the main river and its tributaries above Celilo Falls consist mainly in blasting obstructing rock and boulders, raking gravel bars and building concentrating dikes. These had, up to June, 1904, cost some \$300,000. There are more recent recommendations for additional improvements to the amount of \$400,000 more. The wisdom of having as much as possible of the upper river and its tributaries in good navigable condition at the time of the completion of The Dalles-Celilo project is evident.

The effect to be anticipated from an "open river" on freight charges may be illustrated in several ways. The present rate on wheat from Lewiston-Clarkson, Idaho (a little below the head of navigation on the Snake), to Portland is \$5.20 per ton. A most reliable river captain holds that this rate would be reduced to a figure between \$1.60 and \$2.10 per ton. As the rates on heavier commodities along the Mississippi, per ton mile, are about one-tenth of the present rail rates along the Snake and Columbia waterways, such an estimate seems reasonable. For a distance of eighty-eight miles, from Portland to The Dalles, the rate on salt is \$1.50 per ton on car-load lots, and \$3.00 on less than car-load lots. The corresponding figures for a distance 100 miles farther, to Umatilla, where no river competition exists, are, respectively, \$7.50 and \$12.00 per ton, or four times the water rates.

The area drained by the Columbia and its tributaries comprises some 250,000 square miles. While there is more waste area in this than in an equal area of the Mississippi basin, it

must be taken into consideration that some of this and in widely separated sections is selling at \$1,200 an acre. The additional value that will be given to this vast area by an "open river" will make the cost of the improvements of the Columbia seem very small. That improvement will call into active operation many industries that wait only for the presence of reasonable transportation facilities to spring into life. The extension of irrigation enterprises will only equalize the flow of the streams in a salutary way for the interests of navigation. With the waterways of the Columbia basin open, as the expenditure of a reasonable sum will suffice to improve them, the Pacific Northwest will probably equal in wealth any other most favored section of like area in the country.

With the projected improvements completed, and a few more minor ones on the upper Columbia, the Pacific Northwest would have transportation facilities comparable with those that will be possessed by the Trunk line territory when New York's project for making a ship-channel of the Erie Canal is completed. What the Pacific Northwest system would lack in the size of cargo it could float it would make up in being a more direct route and in being available during more months of the year.